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In view of the important bearing of BEER and ARBER's conclusions upon various cytological and physiological problems, it is to be hoped that future investigations may throw some light upon the following questions:

1. Are BEER and ARBER's phragmospheres actually hollow spheres of kinoplasm or ring-shaped phragmoplasts such as occur in other tissues of the higher plants?

2. If they are ring-shaped phragmoplasts, as seems probable, do they form cell plates?

3. Are the nuclei of the "binucleate cells" separated by a thin membrane, or does the cell plate disappear without forming a membrane?

4. Do the nuclei of multinucleate cells arise by the same type of nuclear division as the nuclei of binucleate cells?—I. W. BAILEY.

Hepaticae.—Among recent publications on the Hepaticae by EVANS are the following. In continuation of studies of the New England Hepaticae,³ three species of *Nardia* are fully discussed, one of them being described as new. In continuation of the North American Hepaticae,⁴ other species of *Nardia* are considered, also additions to the flora of the United States, extensions of range, and clearing up some difficulties in nomenclature. A taxonomic study of *Dumortiera*⁵ contains a full discussion of the two species as to structure, classification, stations, and literature.

A new *Riccia*⁶ (*R. bistriata*) from Peru presents a noteworthy feature in "the peculiar bands of thickening which are found in the walls of the green cells," a feature which has not before been noted in the Marchantiales. Three species of *Asterella*⁷ from South America are presented as new combinations, transferred from *Fimbriaria*. They are not known to extend into North America; in fact, of the 15 North American species, only two are known to extend into South America.—J. M. C.

Ripening of tomatoes.—SANDO⁸ finds that the maturity of a tomato is dependent upon its age and not upon its size in the growing conditions under which he worked. His analyses show that throughout the ripening period there is an increase in moisture, acids, and sugars, and a decrease in solids, total nitrogen, starch, pentosans, crude fiber, and ash. Sugars increase from

³ EVANS, A. W., Notes on New England Hepaticae. XV. *Rhodora* 21:149-169. pl. 126. figs. 14. 1919.

⁴ ———, Notes on North American Hepaticae. VIII. *Bryologist* 22:54-73. pl. 2. figs. 15. 1919.

⁵ ———, A taxonomic study of *Dumortiera*. *Bull. Torr. Bot. Club* 46:167-182. 1919.

⁶ ———, A new *Riccia* from Peru. *Torreyia* 19:85-88. fig. 1. 1919.

⁷ ———, Three South American species of *Asterella*. *Bull. Torr. Bot. Club* 46:469-480. 1919.

⁸ SANDO, CHAS. E., The process of ripening in the tomato, considered especially from the commercial standpoint. U.S. Dept. Agric., Bull. 859. 1920.

25.66 per cent in the fruit 14 days old to 48.32 per cent in ripe fruit. Starch decreases in the same period from 15.84 per cent to 2.65 per cent. Fruit picked after it had started to color and allowed to ripen in free access of air showed practically the same composition and edible qualities as fruit ripened on the vine. Commercially ripened tomatoes, due to lack of free access of air, show very different composition and inferior taste. Lack of ventilation during ripening increased the acid content 138 per cent and decreased the soluble carbohydrate content 21 per cent. Commercially ripened tomatoes wrapped with one paper showed similar but less marked changes. SANDO is unable to explain why wrapping with three papers was less detrimental than wrapping with one.—WM. CROCKER.

Seed sterilization.—BRAUN⁹ has developed what he calls the “presoak” method of seed sterilization. “The use of formalin and copper sulphate as now practiced usually causes retardation and injury to seed germination.” He finds that he can eliminate this injury by soaking the wheat seeds ten minutes and covering them for six hours to allow them to absorb the adhering water. Then follows the usual treatment with the disinfectant. The presoak method often shows a noticeable stimulative effect. BRAUN speaks of presoaking as saturating the walls and cells of the seeds so as to dilute the disinfectants beyond an injurious concentration. He also speaks of presoaking as increasing the efficiency of the disinfectants by bringing the dormant bacteria and fungi into a vegetative state so they are more easily killed by the disinfectants.—WM. CROCKER.

Plant distribution in South Africa.—An analysis of the plant population of South Africa by BEWS¹⁰ shows that while WILLIS’s “age and area” theory may be in general accepted, its application is not feasible in the region under discussion, on account of the very great climatic variations. Species widely distributed in South Africa are found to belong to pioneer stages of the various plant successions, although not all pioneer forms are widely distributed. Many species with a restricted distribution are shown to belong to climax associations, especially in the coast belt forest of Natal.—GEO. D. FULLER.

Studies in *Taraxacum*.—STORK¹¹ has extended our knowledge of this interesting genus, discovering “parthenogenesis” in additional species, in the sense that the unfertilized egg develops an embryo, but it is a diploid egg. He also records some interesting variations in the genus, and gives an account of megasporogenesis in *T. erythrospermum*.—J. M. C.

⁹ BRAUN, HARRY, Presoak method of seed treatment: A means of preventing seed injury due to chemical disinfectants and of increasing germicidal efficiency. Jour. Agric. Res. 19:363-392. 1920.

¹⁰ BEWS, J. W., Plant succession and plant distribution in South Africa. Ann. Botany 34:287-297. 1920.

¹¹ STORK, HARVEY E., Studies in the genus *Taraxacum*. Bull. Torr. Bot. Club 47:199-210. 1920.